

the Tehachapi range to the Mexican border. Then again, no action should be taken until the authorities are assured that the impounding of the stray dog may be followed by a sufficiently long period of quarantine to cover the incubation period of the exposed and bitten dogs, which varies from 7 to 150 days for dogs, and 10 to 260 days for cats. In considering the advisability of this undertaking, the authorities must always realize that the net which collects and renders harmless the stray dog will sooner or later collect some pet animal. These victims of the quarantine procedures which must—to repeat—be ruthlessly administered sometimes, serve as a starting point for numerous controversies. The method of restraint has, therefore, remained unpopular in the majority of American communities. Even when attempted with the best of intentions, the method frequently failed since a strictly enforced, prolonged quarantine and impounding ordinance is rarely tolerated by the dogs and their owners. Animal lovers, humane societies supported by an inadequately informed press and its readers, combined with the inherent human aversion against restriction, sooner or later puncture the most carefully planned control campaign and nullify its effectiveness. In a small, densely populated, readily surveyed area, the method of restraint is more readily administered than in territories with a more scattered population. Experience alone must determine the efficacy of this procedure in southern California. Neither precedent nor past information can serve as a dependable guide. Notwithstanding the disadvantages and objections which have been outlined, it must always be remembered that compulsory restraint has twice freed Great Britain from infection. Many communities, aroused by the unnecessary fatal cases of human rabies, have demonstrated the efficacy of a vigorously and fearlessly enforced quarantine, impounding and elimination of the stray dog.

PREINFECTIONAL ANTIRABIC VACCINATION

2. In view of the difficulties inherent to the quarantine methods, health authorities have in recent years advocated the *preinfectional antirabic vaccination*. While the experimental evidence leaves no doubt that various types of vaccines, the phenol-killed or the chloroform-treated induce immunity that may persist for some months, data relative to their efficacy under field conditions are meager and contradictory. In fact, the unbiased observer finds it difficult to judge the extent to which the vaccination has served as a factor in the control of rabies.

However, one conclusion is justified: vaccination will never replace the veterinary police measures. No protective vaccination is 100 per cent successful; failures in dogs with single injections of antirabic vaccine have been reported. The rabid dog or the animal suspected of rabies must be impounded, and the stray dog must be caught and rendered harmless. The same objections which delay and reduce the force of the restraining methods are usually raised against vaccination. As a means to shorten the quarantine and muzzling period or to facilitate its enforcement,

voluntary vaccination with phenol or chloroform treated preparations may receive favorable consideration. The organization of the control measures should include the supervision and compilation of the data on the vaccination by means of a simple reporting system.

APPLICATION OF ABOVE PRINCIPLES

In order to apply the principles here detailed, the following steps must be taken:

- (a) Solicit the support of the people and the humane societies.
- (b) Organize an educational campaign among and through the newspapers.
- (c) Instruct the police force, which will act as the executive branch of the control procedures.
- (d) Issue a muzzling and leashing ordinance.
- (e) Impound or destroy the stray dogs and cats.

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THE LURE OF MEDICAL HISTORY

COMPARATIVE RELIGIOTHERAPY*

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A bill recently introduced in the California legislature would create a separate medical board for the licensing of "Christian healers" to treat "spiritual, mental, and physical disease" by the laying on of hands, consecrated oil, etc.¹

AT least ten million intelligent and conscientious American citizens today are skeptical of the methods and tenets of material medicine. These millions find their only therapeutic logic in the spiritual concepts of the church. To them material therapy is atheism, a sin for them to employ personally, or allow to be employed with their children.

It is estimated that at least one hundred thousand preventable deaths take place each year as a result of this disharmony between the laboratory and the pulpit.

A popular understanding of the parallel evolution of medicine and theology and of the religious faith camouflaged today in so-called materialistic science might go far to bring about the desired harmony.

PART I

ANCESTRAL MEDICINE PRIOR TO THE CHRISTIAN ERA

Animistic Concepts That Preceded Development of Religion.—The medicinal "hunches" of our prehistoric ancestors were presumably similar to the current native curative arts of the Congo

* Popular medical lecture, Stanford University School of Medicine, San Francisco, January 9, 1931.

¹ This bill was sponsored by Revs. Lombard and McLeod, San Francisco Christian Science practitioners, and by Revs. Cameron and Bussell, Los Angeles representatives of the American Federation of Healers. The bill, however, was tabled by the Senate Committee, March 30, 1931. (Associated Press dispatch.)

and the Orinoco. Such healing wizardries are based on the animistic concepts of nature, a pseudoscience that preceded the development of religion.²

Water flows. It is therefore, alive. Its surface is agitated by the thrown stone. Water, therefore, has sensation. This sentient liquid buries itself in the sand to escape the tropical sun, thus revealing its rationality.

Water drives out the choking demons of thirst. It is thus a friend of man. But it drowns the unwary and is, therefore, a potential enemy. Wild or angry water is thus a logical pathogenic virus, inundating human flesh in anasarca and serous exudate. Friendly or domesticated water is an equally logical therapeutic servant, drowning or washing away nonaquatic pathogenicities.

The body of man melts to water in perspiration, tears, urine, and saliva. Water is, therefore, human: melted human flesh.

Water, in short, is a conscious, intelligent, potentially human personality which may sleep in the form of ice, dance as waves, semivolatilize to a bird-like fog, or fully dematerialize³ into the great intangible Thunder Bird, general humidity. In each of these four physical states, water is a potential infectious agent and an equally logical living therapy.

Invisible emanations from a nearby lake are aspirated into the human eye and are there condensed into a miniature lake, the primitive concept of vision.⁴ On turning the eyes away, this optically aspirated retinal lake diffuses throughout and becomes a living part of human flesh, the primitive theory of memory.

At will this living memory water may be divorced from solid tissues and recorralled in the human eye, the stone-age theory of visualization. From the eye part of this reassembled memory water volatilizes or is willed to evaporate outward, the ancient theory of optical projection. Or the living lake memory may be outwardly projected from the throat, the spoken name of the lake being a nascent lake spirit motivated by human will. This living word⁵ may be willed to invade enemy ears as pathogenic or carnivorous water, or to surround and penetrate human flesh as a living hydrotherapy.

This aqueous psychoanalysis epitomizes stone-age medicine. Each object in nature is a crystallized or materialized gas or soul, or colony of

souls.⁶ Spirits sleeping in solid parts; wide awake in blood, sap, urine, saliva, and perspiration; keenly alert in respiratory tide, body odors, and plant perfumes; diffusing outward in ever-increasing dilution to fuse with the generalized ether of its clan. Each wild or unfriendly man, animal, plant, and inanimate object is thus a potentially pathogenic demon, or carrier of demons. Won to coöperative friendship, each may function as an equally logical spiritual therapy.

Carnivorous mosquito gas logically devours, dominates, transmutes or transubstantiates human flesh.⁷ This pathogenic ghost is equally logically killed or driven from malarious flesh by loyal friendly ethers from ceremoniously adopted, insectivorous beaks, claws, or feathers. Or it may be coaxed from infected flesh onto loyal juicy mosquitophilic bananas.

Domesticated snake oil ceremoniously married to human bones logically grafts hypermobile snake spirit onto rheumatic joints. Moleskin ethers logically become symbiotic with human vision, engrafting onto the human eye the mole's ability to see in the dark. The medicinal gong logically broadcasts loyal, epidemiologically trained metal-spirit to battle with prowling miasmas.

Therapy by Captured Personality Ethers Which Have Escaped at Death.—In selecting such apparently lifeless objects as beaks, claws, and feathers as sources of therapeutic gases, jungle science was well aware that it was dealing with dormant drugs, the wide-awake personality ethers having escaped at the time of death. Methods were, therefore, devised for the capture of these highly alert, disincarnate therapeutic emanations.

Such methods are well illustrated by the jungle technique of solar transubstantiation, one of the simpler fire-making ceremonials. Facing the sun, the technician first fills his eyes with the radiated ghost of the Father of All Fire. He then directs his gaze to the fuel, optically projecting the captured retinal image onto the tip of the fire drill. As the drill revolves it reels in this optically projected sun-gas, till sufficient fire-spirit is collected on the drill to digest, eat, transmute, or transubstantiate the adjacent fuel.

By somewhat similar techniques human, animal, plant, and mineral⁸ ghosts are captured and corralled in convenient objects. Domesticated wild-cat souls devour miasmatic rodents. Tamed tree-spirits shield from the tropical sun. Captive ethers from the dawn drive away the ever hungry anthropophagic spirits from the west.⁹

² Frazer, J. G.: *The Golden Bough*, Abridged Edition, Chap. IX, p. 117. 1927.

³ "Evaporation" and "dematerialization" are synonymous in primitive science. "Spirit," "ghost," "ether," and "gas" are also interchangeable. Our modern differentiations date from the middle of the seventeenth century, when it was shown that air is a material substance, having definite weight and a definite coefficient of elasticity. Singer, C. *Short History of Medicine*, Chap. IV, p. 125. 1928.

⁴ For our own classical versions of this spiritual theory of vision, see: Allbut, C., *Greek Medicine in Rome*. The Fitzpatrick Lectures on the History of Medicine, Chap. III, p. 103. 1921.

⁵ The concept of sound as a living spirit did not disappear from medieval science till the demonstration of material nature of air. The transition is well illustrated by Bacon's argument that it is not the Divine Spirit broadcast or dematerialized from consecrated temple bells that controls the storm, but "concussions" in the elastic atmosphere. See: Frazer, J. G., *Folklore in the Old Testament*, Chap V, p. 426. 1923.

⁶ From two to seven independent or mutually dependent spirits are at times pictured in each object. When an American Indian describes his "soul" as twelve inches high, he usually refers to but one of his four to seven corporeal ghosts. This multiplicity of somatic essences reached its height in ancient Egypt, thirty-six spirits (or functions) then being pictured in the human body.

⁷ Malaria is known as "mosquito disease" by certain South American Indians. Contagious ophthalmia was "fly infection" in ancient Egypt. Sleeping sickness is infection with carnivorous "fly ghosts" in equatorial Africa.

⁸ For mineral ghosts or "spirits of inanimate objects," see Karsten, R., *The Civilization of the South American Indians*, Chap. II, p. 329.

⁹ For the "guardian spirit therapy" of North American Indians, see: Goldenweiser, A. A., *Early Civilization*, Chap. X, p. 184. 1922.

Such captive ethers not only function as individual antitoxins, but may be united, synthesized or trained to coöperative teamwork. Thus united they form a giant polyvalent spiritual therapy. A medicine bag may contain a dozen captive ghosts, ceremoniously fused to form a unit medicinal ether, capable of conquering a wide range of visible and invisible pathogenicities. Fattened with sacrificial meats, reinforced with human blood, such a synthetic polyvalent spirit may be increased in size, strength, and wisdom, till it becomes the major therapeutic dependability of a tribe.¹⁰

Numerous logical techniques are employed to administer adequate doses of such a healing god.¹¹ Ceremoniously transubstantiated into loaves, an effective dose of its curative spirit may be swallowed or applied directly to ailing human flesh.¹² In certain primitive cultures the sacramental loaf¹³ is supplied with eyes, ears, heart and genitalia, and the transubstantiated god afterward dissected into organ-specific alkaloids. The spiritually charged eyes thus become logical specifics for failing vision. The consubstantiated legs logically expel the carnivorous ethers of rheumatism. The blessed genitalia logically restore lost manhood, or may be used in the ceremonious fertilization of virgins.

Results Attendant Upon Hybridization of Medicinal God with Domestic Animals and Human Mates.—To increase the loyalty of a medicinal god it was often ceremoniously hybridized with domestic animals or with selected human mates. Bulls sired by an astronomical ether bellowed defiance to oncoming storms. Virgins transubstantiated with botanical spirit telegraphed reproductive urge to nearby crops. Solar-hybridized youths drove back nocturnal spiritual anthropophagi.

From such a local hybrid an effective dose of therapeutic spirit is logically transferred by physical contact, by saliva, urine or feces, or by aural, optical or telepathic aspiration. The dung of bovine celestial hybrids is today the supreme antiseptic of a hundred million Hindus, the blessed bovine urine their major spiritual purification. The dung of dogs ceremoniously hybridized with the healing god Aesculapius was one of the most potent drugs of ancient Greece.¹⁴

¹⁰ For the synthetic origin of early pagan gods, see: Frazer, J. G., *The Golden Bough*, Chap. XXVIII, p. 315. 1927.

¹¹ Jayne, W. A., *The Healing God of Ancient Civilizations*, Yale University Press. 1925.

¹² For the Aztec therapeutic transubstantiation technique, see: Frazer, J. G., *The Golden Bough*, Chap. L, p. 488.

¹³ In Central America this edible therapeutic idol was usually made of a mixture of cornmeal and honey or of cornmeal and chicken blood.

¹⁴ Jayne, W. A., *The Healing God of Ancient Civilizations*, pp. 285, 411. This use of sacramental dung as a logical carrier of "spiritual bacteriophage" was based on the primitive theory of digestion and excretion and had a hundred other equally logical applications, such as in adoption, naturalization, and marriage ceremonials. This passive reinforcement of the individual's own "spiritual antitoxins" with divine "fecal antiseptics" must not be confused with numerous other primitive fecal therapies, oral or cutaneous vaccination with vermin dung or with the dung of noxious insects, for example, actively immunizing the individual against specific or group-specific infectious demons.

Instead of increasing divine friendship, however, such hybridization often had the opposite effect, the pampered healing god enslaving his would-be human friends, demanding daily potions of human blood, periodic feedings with quivering animal or human hearts, commanding constant ceremonious vaudeville, and punishing ritualistic neglect. From this wholly unwished-for result there was born a new theory of disease, disciplinary pathogenesis, purposeful metamorphosis of the healing god into a septic devil, or purposeful withdrawal of his antiseptic spirit, his human slaves abandoned to ever-hungry malignant ethers. Logical prophylaxis thus became bribery, flattery, and cringing conformity to antiseptic will. Logical therapy was human blood, ripe virgins, and special vaudeville, that the angry celestial ether might be lured back into the village and recorralled in his local images.

One special technique of world-wide use was the therapeutic apology or medicinal confessional. In subtropical America this often took the form of a whining enumeration of wholly imaginary sins or disobediences, pretended demonic interference with wished-for obedience to divine commands. By Indian logic, the self-centered god might not be interested in mere human aches and pains, but would exert himself to drive out demons reducing tribal efficiency in his prescribed ritual. He would thus inadvertently scare away minor pathogenicities.

More civilized heathen gods, however, often coöperated with pagan clinicians, had regular office hours and regular fees for consultation service. Revelation diagnosis and revelation therapy thus became routine methods in medical practice, the friendly healing ether speaking in thunder, or in coded message on sacrificial livers.

Hygienic failure of such a civilized pagan deity was often excused and attributed to his illness or senility. Celestial catharsis was a logical antidote, formal physicing of the incompetent invisible therapy through his transubstantiated symbols. Celestial tonics, dosings with alcohol or cocaine, ceremonious delousing with tobacco smoke, and divine rejuvenation with human blood, semen, pulsating hearts, or other fragments carved from living human flesh.¹⁵

If, however, hygienic incompetence was attributed to celestial laziness, more heroic methods were at times employed. Transubstantiated into his idols, the balky healing spirit was lashed with whips, defiled with dung or tortured with fire, till he promised effective medicinal service. Still refractory, he was detransubstantiated, and banished to hell.¹⁶

Such extreme disciplinary measures, however, were not without danger. A smarting antitoxic ether thus excommunicated and forced to consort with the anthropophagi of the underworld might well return with an acquired lust for human flesh.

¹⁵ For such rejuvenation techniques on the Western Hemisphere, see: Karsten, R., *The Civilization of South American Indians*, Chap. XII, p. 377.

¹⁶ The healing gods were thus disciplined in ancient Egypt. Even the Supreme Buddha is subject to therapeutic discipline today in central Asia.

One banished healing god of ancient Egypt thus returned to captain later pestilences and gangrenes.

To avoid this danger, radically different techniques were at times employed, surrender therapy, formal flattery, bribery, and fake servitude to an unconquerable miasma. In ancient India the entire nation thus bowed in pseudoadoration to smallpox, temples, and human servants were consecrated to her service, each communicant being marked with the sacramental vaccination scar, that the carnivorous demoness might recognize those on whose flesh she was honor-bound not to feed.¹⁷

(Part II will be printed in next month's issue.)

¹⁷ In ancient Rome symptoms, rather than diseases, were thus propitiated, the demonesses of pain, fever, stench and itching, for example. See: Jayne, W. A., *The Healing God of Ancient Civilization*, pp. 399-402, 461-464.

CLINICAL NOTES AND CASE REPORTS

THE MERTHIOLATE—A NEW ANTISEPTIC*

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A NEW antiseptic, commercially called merthiolate,¹ has appeared within the past few months. Such agents are so numerous that it is difficult to weigh their respective merits. This particular substance is put out by a reputable manufacturer of biologic products, and is sponsored by one of the staff, a man of wide scientific and practical experience. It is the purpose herein to summarize certain facts claimed for merthiolate and to present concisely some of the accumulating local observations regarding this product.

PHYSICAL CHARACTERISTICS

Merthiolate is one of a series of organic mercury compounds synthesized in Chicago during recent years.^{2,4} It is the sodium salt of ethylmercuri thiosalicylic acid, $C_2H_5HgSC_6H_4COONa$, apparently the ortho compound. It is a white crystalline substance,³ 49 per cent mercury. It is precipitated by salts of heavy metals and by acid, but it is soluble, even one part to one part, in water, serum, and the ordinary biologic solvents. It is miscible in soap and alcohol. It is very slightly ionized. In solution it is nearly colorless and tasteless. It is said to be stable in ordinary concentrations of germicidal strength. It has been the experience locally, however, that ten per cent and one per cent aqueous stock solutions crystallize badly on standing for some days under ordinary laboratory conditions. This physical property merits close inspection. Although biologic tests are not sufficiently sensitive to measure a minor reduction in efficiency of merthiolate, due to this crystallization, some reduction should be expected. Furthermore, if crystallization occurs, even though macroscopically imperceptible, in weak merthiolate solutions used for parenteral injection (vaccines or serums preserved with this

substance, direct intravenous injection of merthiolate, et cetera), a pronounced irritation might be expected. In human intravenous injections³ recorded, local inflammation "due to infiltration" was noted in two of twenty-two cases.[†]

TOXICITY

The toxicity of merthiolate is low. No work locally has involved doses which approach the toxic limit. Rabbits are said to withstand 25 milligrams/kilo, rats 45 milligrams/kilo, and mice somewhat more. If the limit is exceeded, the pathologic picture is that of mercurial poisoning. Dogs withstood two milligrams every third day for twelve doses. Guinea-pigs injected with five cubic centimeters into the peritoneal cavity showed severe reactions with 1:1000 dilutions, moderate with 1:2000, and none with 1:4000 and 1:8000 dilutions. The advocated strength in serums and vaccines is 1:5000 or 1:10,000. In man, twenty-two patients have been injected intravenously with one per cent solution, except as noted above, with no reaction. The maximum single dose was 50 cubic centimeters, and the greatest total dose was 180 cubic centimeters given in five doses.

The action on bacteria indicates a high degree of activity. References state that the typhoid bacillus is killed by 1:3000 dilution in ten minutes; the staphylococcus by 1:4000 in the same time. Heavy bacterial suspensions are killed usually in one day at dilutions of 1:10,000 without loss of antigenic properties. Dilutions of 1:1,000,000 inhibit the growth of ordinary bacteria. The substance diffuses in agar to a greater extent than some disinfectants.

Local tests have included no direct clinical applications, but they support the claims regarding germicidal or bacteriostatic activity. Some observations on vaccines and serologic tests have also been made.

The phenol coefficient was estimated at close to 200 (F. S. Paine) as compared to the more conservative figure (40 or 50) stated by Powell and Jamieson.

Heavy bacterial antigen suspensions were killed readily. *Bacterium typhosus* was killed in one per cent concentration of organisms by 1:9000 merthiolate in less than twenty-four hours (E. Lewis). Still heavier suspensions of undulant fever organisms were killed by 1:10,000 merthiolate in less than twenty-four hours (L. Veazie). This has been repeated by others many times. In broth, dilutions as high as 1:40,000,000 inhibited staphylococcus growth for forty-eight plus hours. In agar, 1:5,000,000 was the lowest dilution which permitted bacterial growth; higher dilutions inhibited the staphylococcus (H. Prichard). No evidence is at hand to indicate that this substance, used 1:10,000, in preservation of immune serums has any objectionable features. The preservation is perfect, and there is no apparent clouding, precipitation, or discoloration.

OTHER OBSERVATIONS

Although there exists no accepted technique for germicidal tests on fungi, a preliminary test

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† A recent communication states that precipitation occurs only in unbuffered solutions.